

CLAIMS

What is claimed is:

1. A lookup table comprising:
 - a plurality of mappers which are indexed by portions of a search key and partial indexes to output a route index for the search key or partial indexes to subsequent mappers; and
 - a partial index feedback loop by which a mapper is indexed in multiple passes with multiple portions of the search key.
2. The lookup table as claimed in Claim 1 wherein the route index corresponding to the search key is stored in a single location in one of the plurality of mappers.
3. The lookup table as claimed in Claim 1 wherein the length of the search key is variable.
4. The lookup table as claimed in Claim 3 wherein the search key includes a 32-bit IPv4 address.
- 15 5. The lookup table as claimed in Claim 4 wherein the route index corresponding to the search key is found after a first search of the plurality of mappers.
6. The lookup table as claimed in Claim 3 wherein the search key includes a 128-bit IPv6 address.
7. The lookup table as claimed in Claim 1 wherein the partial index is a subtree index.

8. A method for providing a longest prefix match for a search key comprising the steps of:

providing plural portions of the search key to successive mappers with partial indexes from prior mappers to index entries in the mapper, each entry storing a route index or a partial index for a subsequent mapper; and

feeding back a partial index from a subsequent mapper to a prior mapper to loop through plural indexes to the prior mapper with plural portions of the search key.

10 9. The method as claimed in Claim 8 further comprising the step of:

outputting the route index corresponding to the search key stored in a single entry in one of the plurality of mappers.

10. The method as claimed in Claim 8 wherein the length of the search key is variable.

15 11. The method as claimed in Claim 10 wherein the search key includes a 32-bit IPv4 address.

12. The method as claimed in Claim 11 wherein the route index corresponding to the search key is output after a first search of the plurality of mappers.

13. The method as claimed in Claim 10 wherein the search key includes a 128-bit IPv6 address.

20 14. The method as claimed in Claim 8 wherein the partial index is a subtree index.

15. A lookup table comprising:

a plurality of mappers which are indexed by portions of a search key and partial indexes to output a route index corresponding to the search key or partial indexes to subsequent mappers; and

means for feeding back a partial index from a subsequent mapper to a prior mapper to loop through plural indexes to the prior mapper with plural portions of the search key.

- 5 16. The lookup table as claimed in Claim 15 wherein the route index corresponding to the search key is stored in a single location in one of the plurality of mappers.
- 10 17. The lookup table as claimed in Claim 15 wherein the length of the search key is variable.
18. The lookup table as claimed in Claim 17 wherein the search key includes a 32-bit IPv4 address.
19. The lookup table as claimed in Claim 18 wherein the route index corresponding to the search key is found after a first search of the plurality of mappers.
- 15 20. The lookup table as claimed in Claim 17 wherein the search key includes a 128-bit IPv6 address.
21. The lookup table as claimed in Claim 15 wherein the partial index is a subtree index.
22. A lookup table providing a route index from a search key comprising:
20 a first mapper which receives a portion of the search key to index an entry which stores a route index corresponding to the search key or a first partial index to a next mapper;

- at least one next mapper which receives another portion of the search key and a partial index to index a next mapper entry which stores the route index corresponding to the search key or a next partial index to a next mapper; and
- 5 a selector which selects the next partial index fed back from a next mapper or the first partial index from the first mapper as the partial index to the at least one next mapper.
23. An apparatus for providing a route index corresponding to a search key comprising:
- 10 a forwarding engine which receives the search key and provides a portion of the search key as a mapper key; and
- 15 a lookup table coupled to the forwarding engine, which receives the mapper key from the forwarding engine, the lookup table comprising:
- a plurality of mappers which are indexed by portions of a search key and partial indexes to output the route index to the forwarding engine for the search key or partial indexes to subsequent mappers; and
- a partial index feedback loop by which a mapper is indexed in multiple passes with multiple portions of the search key.